

Application No. 09/586,479

Docket No.: 1173-1052PUS1

Docket No.: 1173-1052PUS1  
(PATENT)**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

---

In re Patent Application of:  
ALEXANDER C. SCHMIDT et al.

Application No.: 09/586,479

Confirmation No.: 8296

Filed: June 1, 2000

Art Unit: 1648

---

For: **ATTENUATED HUMAN-BOVINE CHIMERIC  
PARAINFLUENZA VIRUS (PIV) VACCINES**

---

Examiner: S. B. Chen

**LISTING OF THE CLAIMS**

1-83. (Previously Canceled)

84. (Canceled)

85. (Currently Amended) An infectious human-bovine chimeric parainfluenza virus (PIV) comprising a major nucleocapsid (N) protein, a nucleocapsid phosphoprotein (P), a large polymerase protein (L), and a partial or complete chimeric human PIV3 (HPIV3)-bovine PIV3 (BPIV3) genome or antigenome, in which said partial or complete PIV ~~vector~~ genome or antigenome comprises a polynucleotide encoding a wild-type L protein ~~of the vector PIV~~.

86. – 87. (Canceled)

88. (Previously Presented) The infectious human-bovine chimeric PIV of claim 85, in which the partial or complete chimeric genome or antigenome further comprises a BPIV3 N gene or a polynucleotide comprising the open reading frame thereof operably linked to regulatory sequences operable in said chimcric PIV genome or antigenome.

89. (Previously Presented) The infectious human-bovine chimeric PIV of claim 88, in which the partial or complete chimeric genome or antigenome further comprises a P gene of

Application No. 09/586,479

Docket No.: 1173-1052PUS1

human PIV3 or a polynucleotide comprising the open reading frame thereof operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

90. (Previously Presented) The infectious human-bovine chimeric PIV of claim 85, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a HN or F gene of a human PIV operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

91. (Previously Presented) The infectious human-bovine chimeric PIV of claim 88, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a HN or F gene of a human PIV operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

92. (Previously Presented) The infectious human-bovine chimeric PIV of claim 89, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a HN or F gene of a human PIV operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

93. (Canceled)

94. (Previously Presented) The infectious human-bovine chimeric PIV of claim 85, in which the partial or complete chimeric genome or antigenome comprises at least one gene segment encoding an open reading frame of a human PIV HN gene operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome and at least one gene segment encoding an open reading frame of a F gene of a human PIV operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

95. (Previously Presented) The infectious human-bovine chimeric PIV of claim 88, in which the partial or complete chimeric genome or antigenome comprises at least one gene segment encoding an open reading frame of a human PIV HN gene operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome and at least one gene segment

Application No. 09/586,479

Docket No.: 1173-1052PUS1

encoding an open reading frame of a F gene of a human PIV operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

96. (Previously Presented) The infectious human-bovine chimeric PIV of claim 89, in which the partial or complete chimeric genome or antigenome comprises at least one gene segment encoding an open reading frame of a human PIV HN gene operably linked to regulatory

Application No. 09/586,479

Docket No.: 1173-1052PUS1

sequences operable in said chimeric PIV genome or antigenome and at least one gene segment encoding an open reading frame of a F gene of a human PIV operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

97. (Canceled)

98. (Currently Amended) The infectious human-bovine chimeric PIV of claim 85, in which the partial or complete chimeric genome or antigenome further comprises a bovine PIV P gene or a polynucleotide encoding the open reading frame thereof operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

99. (Previously Presented) The infectious human-bovine chimeric PIV of claim 98, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a HN or F gene of a human PIV operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

100. (Canceled)

101. (Previously Presented) The infectious human-bovine chimeric PIV of claim 98, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a human PIV HN gene operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome and at least one gene segment encoding an open reading frame of a F gene of a human PIV operably linked to regulatory sequences operable in said chimeric PIV genome or antigenome.

102 - 103 (Canceled).

Application No. 09/586,479

Docket No.: 1173-1052PUS1

104. (Previously Presented) The infectious human-bovine chimeric PIV of claim 85 in which the partial or complete chimeric genome or antigenome includes at least one mutation at a position corresponding to a mutation in the HPIV3<sub>cp45</sub> selected from the group consisting of Val96 of the N protein, Ser389 of the N protein, Ile96 of the C protein, Ile420 of the F protein, Ala450 of the F protein, Val384 of the HN protein, nucleotide 23 of the 3' leader sequence, nucleotide 24 of the 3' leader sequence, nucleotide 28 of the 3' leader sequence, nucleotide 45 of the 3' leader sequence and nucleotide 62 in the N gene start sequence.

105 – 106 (Canceled)

107. (Previously Presented) The infectious human-bovine chimeric PIV of claim 85 that further comprises a supernumerary gene comprising an open reading frame encoding a protein, or an antigenic portion thereof, from an additional virus.

108. (Previously Presented) The infectious human-bovine chimeric PIV of claim 107, in which the supernumerary gene comprises a gene start sequence of HPIV3 or BPIV3 operably linked to an open reading frame encoding a protein or an antigenic portion thereof from said additional virus in turn operably linked to a gene end sequence of HPIV3 or BPIV3.

109 – 112 (Canceled)

113. (Previously Presented) The infectious human-bovine chimeric PIV of claim 88 that further comprises a supernumerary gene comprising an open reading frame encoding a protein, or an antigenic portion thereof, from an additional virus.

114. (Previously Presented) The infectious human-bovine chimeric PIV of claim 113, in which the supernumerary gene comprises a gene start sequence of HPIV3 or BPIV3 operably linked to an open reading frame encoding a protein or an antigenic portion thereof from said additional virus in turn operably linked to a gene end sequence of HPIV3 or BPIV3.

Application No. 09/586,479

Docket No.: 1173-1052PUS1

115. (Previously Presented) The infectious human-bovine chimeric PIV of claim 89 that further comprises a supernumerary gene comprising an open reading frame encoding a protein, or an antigenic portion thereof, from an additional virus.

116. (Previously Presented) The infectious human-bovine chimeric PIV of claim 115, in which the supernumerary gene comprises a gene start sequence of HPIV3 or BPIV3 operably linked to an open reading frame encoding a protein or an antigenic portion thereof from said additional virus in turn operably linked to a gene end sequence of HPIV3 or BPIV3.

117. (Currently Amended) An immunogenic composition comprising the infectious human-bovine chimeric PIV of any one of claims 85, 88-92, 90, 94-96, 98-99, 101, 104, and 107-108 and 113-116.

118. (Canceled)

119. (Currently Amended) An isolated polynucleotide comprising a polynucleotide encoding a partial or complete chimeric human PIV3 (HPIV3)-bovine PIV3 (BPIV3) genome or antigenome, in which said partial or complete chimeric genome or antigenome comprises a polynucleotide encoding a wild-type L protein of the vector PIV.

120 - 121 (Canceled)

122. (Currently Amended) The isolated polynucleotide of claim 119, in which the partial or complete chimeric genome or antigenome further comprises a bovine PIV N gene or a polynucleotide comprising the open reading frame thereof operably linked to regulatory sequences operable in said chimeric genome or antigenome.

Application No. 09/586,479

Docket No.: 1173-1052PUS1

123. (Currently Amended) The isolated polynucleotide of claim 122, in which the partial or complete chimeric genome or antigenome further comprises a P gene of a human PIV3 or a polynucleotide comprising the open reading frame thereof operably linked to regulatory sequences operable in said chimeric genome or antigenome.

124. (Previously Presented) The isolated polynucleotide of claim 119, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a HN or F gene of a human PIV operably linked to regulatory sequences operable in said chimeric genome or antigenome.

125. (Previously Presented) The isolated polynucleotide of claim 122, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a HN or F gene of a human PIV operably linked to regulatory sequences operable in said chimeric genome or antigenome.

126. (Previously Presented) The isolated polynucleotide of claim 123, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a HN or F gene of a human PIV operably linked to regulatory sequences operable in said chimeric genome or antigenome.

127. (Canceled)

128. (Previously Presented) The isolated polynucleotide of claim 119, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a human PIV HN gene operably linked to regulatory sequences operable in said chimeric genome or antigenome and at least one gene segment encoding an open reading frame of a F gene of a human PIV operably linked to regulatory sequences operable in said chimeric genome or antigenome.

Application No. 09/586,479

Docket No.: 1173-1052PUS1

129. (Previously Presented) The isolated polynucleotide of claim 122, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a human PIV HN gene operably linked to regulatory sequences operable in said chimeric genome or antigenome and at least one gene segment encoding an open reading frame of a F gene of a human PIV operably linked to regulatory sequences operable in said chimeric genome or antigenome.

130. (Previously Presented) The isolated polynucleotide of claim 123, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a human PIV HN gene operably linked to regulatory sequences operable in said chimeric genome or antigenome and at least one gene segment encoding an open reading frame of a F gene of a human PIV operably linked to regulatory sequences operable in said chimeric genome or antigenome.

131. (Canceled)

132. (Currently Amended) The isolated polynucleotide of claim 119, in which the partial or complete chimeric genome or antigenome further comprises a bovine PIV P gene or a polynucleotide encoding an open reading frame thereof operably linked to regulatory sequences operable in said chimeric genome or antigenome.

133. (Previously Presented) The isolated polynucleotide of claim 132, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a HN or F gene of a human PIV operably linked to regulatory sequences operable in said chimeric genome or antigenome.

134. (Canceled)



Application No. 09/586,479

Docket No.: 1173-1052PUS1

135. (Previously Presented) The isolated polynucleotide of claim 132, in which the partial or complete chimeric genome or antigenome further comprises at least one gene segment encoding an open reading frame of a human PIV HN gene operably linked to regulatory sequences operable in said chimeric genome or antigenome and at least one gene segment encoding an open reading frame of a F gene of a human PIV operably linked to regulatory sequences operable in said chimeric genome or antigenome.

136 – 139 (Canceled)

140. (Previously Presented) The isolated polynucleotide of claim 119 that further comprises a supernumerary gene comprising an open reading frame encoding a protein, or an antigenic portion thereof, from an additional virus.

141. (Previously Presented) The isolated polynucleotide of claim 140, in which the supernumerary gene comprises a gene start sequence of HPIV3 or BPIV3 operably linked to an open reading frame encoding a protein or an antigenic portion thereof from said additional virus in turn operably linked to a gene end sequence of HPIV3 or BPIV3.

142 – 145 (Canceled)

146. (Previously Presented) The isolated polynucleotide of claim 122 that further comprises a supernumerary gene comprising an open reading frame encoding a protein, or an antigenic portion thereof, from an additional virus.

147. (Previously Presented) The isolated polynucleotide of claim 146, in which the supernumerary gene comprises a gene start sequence of HPIV3 or BPIV3 operably linked to an open reading frame encoding a protein or an antigenic portion thereof from said additional virus in turn operably linked to a gene end sequence of HPIV3 or BPIV3.

Application No. 09/586,479

Docket No.: 1173-1052PUS1

148. (Previously Presented) The isolated polynucleotide of claim 123 that further comprises a supernumerary gene comprising an open reading frame encoding a protein, or an antigenic portion thereof, from an additional virus.

149. (Previously Presented) The isolated polynucleotide of claim 148, in which the supernumerary gene comprises a gene start sequence of HPIV3 or BPIV3 operably linked to an open reading frame encoding a protein or an antigenic portion thereof from said additional virus in turn operably linked to a gene end sequence of HPIV3 or BPIV3.

150. (Currently Amended) A method for making a human-bovine chimeric PIV, comprising expressing the isolated polynucleotide of claim 119 ~~in any one of claim~~ in a cell or in a cell-free lysate, said cell or cell-free lysate comprising a major nucleocapsid (N) protein, a nucleocapsid phosphoprotein (P) and a large polymerase protein (L) of a human or bovine PIV.

151. (Previously Presented) The method of claim 150, in which one or more of the N, P and L proteins are expressed from at least one polynucleotide vector separate from the isolated polynucleotide encoding the complete or partial chimeric genome or antigenome.

152. (Currently Amended) An expression vector comprising in operative linkage i) a promoter operative in a mammalian cell or operative in vitro;

ii) a polynucleotide of any one of claims 119, ~~112-126~~, 122-126, 128-130, and 132-133, 135, 140-141 and 146-149[[.]]; and

iii) a transcription terminator sequence operative in a mammalian cell or operative in vitro.

153. (Canceled)

Application No. 09/586,479

Docket No.: 1173-1052PUS1

154. (Previously Presented) The infectious human-bovine chimeric PIV of claim 107, wherein additional virus is a respiratory syncytial virus.

155 – 156 (Canceled)

157. (Previously Presented) The infectious human-bovine chimeric PIV of claim 113, wherein additional virus is a respiratory syncytial virus.

158. (Canceled)

159. (Previously Presented) The isolated polynucleotide of claim 140, wherein the additional virus is a respiratory syncytial virus.

160 – 161 (Canceled)

162. (Previously Presented) The isolated polynucleotide of claim 146, wherein the additional virus is a respiratory syncytial virus.

163. (Previously Presented) The isolated polynucleotide of claim 148, wherein the additional virus is a respiratory syncytial virus.